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THE RIVER MACKENZIE.

By MR. A. J. RUSSELL.

In length of course and the extent of area it drains, it is the second river in North America, exceeded only by the Missouri-Mississippi. From its mouth, in the Arctic ocean, about latitude 69° N., longitude 135° W., to the source of the Athabasca, the most southerly-extending of its two great rival branches, about latitude 52° 20′ N., longitude 118° 25′ W., its length of course is about 2,350 miles ; but to the source of its longest and largest branch, Peace river, about latitude 56° 30′ N., longitude 126° W., its length, as represented, is about 2,510 miles, and may prove greater on being surveyed. The direct length of the basin drained by the Mackenzie, from the source of the Athabasca to the sea, is 1,300 miles ; its greatest breadth 1,000, its total area about 675,800 square miles. The western boundary of its basin is about 1,750 miles in length. Commencing at the source of the Athabasca, between lofty glaciers, where the highest peaks rise to 15,000 feet, far westward, in the broadest part of the Rocky mountains—whose prevailing formation is thick-bedded limestone strata (with fossils of Devonian or carboniferous age), sandy shales and slate,—the water-shed between the basins of Mackenzie and the Fraser river of British Columbia interlaces the main range (as it decreases in breadth and elevation) for 250 miles northward. Then, to include that part of the parallel valley behind the main range containing the upper courses of the Peace river and the River of the Mountains, it passes 200 miles west to the range behind, following it 600 miles north-north-west; then returns 200 miles north-east round the sources of the Yukon, or Pelly river, and turning sharply, curves from north-north-west to north by west, and crossing the Arctic circle divides the waters of the Porcupine branch of the Yukon from those of the Peel river, and at 500 miles reaches the mouth of the Mackenzie. In the latter distance the Rocky Mountains, with a declining elevation, having turned westward into Alaska, are represented here by groups of high hills, or by a high, uneven plateau whose edge, as it breaks down towards the Mackenzie, presents a mountainous aspect. The southern water-shed of the

Mackenzie is generally a straight line of 800 miles east-north-east. Commencing at the source of the Athabasca, about 4,000 feet above the sea, it traverses, for 150 miles, the Rocky Mountains and the hilly, marshy wooded country at their base; then 325 miles of a very fertile, generally wooded country, in which it falls to 1,700 feet at Meshy portage, between the Beaver river and the Athabasca waters; then further 325 miles, through a well-wooded Laurentian country, abounding exceedingly in game, deer and fish, to the height of land beyond Wollaston lake; thence the eastern water-shed of 1,600 miles passes first about 500 miles through a similar and chiefly wooded country, but of increasing sterility, varying from 1,700 to 2,000 feet in elevation; its remaining course traversing the skirt of the vast treeless "barren ground" and Arctic desert (the last 300 miles being on Silurian low lands) to the mouth of the Mackenzie, where the climate is, comparatively, so much milder that the islands are wooded with spruce trees, some of which, in favorable positions on the main-land, are of a large size. Though much of the eastern side of this vast country, besides having a climate of Arctic severity, is a rugged, hilly Laurentian country, generally infertile, and much of the western side of it is occupied by the Rocky Mountains and their lower spurs and outlying ridges, yet exceptionally favorable conditions of climate, soil and mineral resources, with its great reaches of navigable waters, render the great comparatively plains-country of Laurentian, Silurian and more recent formations, which extends through its entire length, having a breadth of from 400 to 300 miles, with vast deposits of coal and petroleum, more valuable and important than its northerly latitude would indicate, especially the southern part of it, which contains tracts of country more favorable for cultivation than any other in the north-western Canadian territories. The comparatively great warmth of the central basin of the Mackenzie is, no doubt, mainly due to the increasing depression northward of the great descending plain of which it forms a part, which, forming an elevation of nearly 5,000 feet at the base of the Rocky Mountains near the international boundary, and nearly 4,000 where the River Athabasca leaves them, falls to 1,600 at Dunvegan on Peace river, the river being there only 910, Lake Athabasca 600, and Fort Liard (where wheat grows well), near latitude 60° N. on the River of the Mountains, only between 400 and 500 feet above the sea.

The Athabasca, or south branch of the Mackenzie, has its source between lofty glaciers, near summits rising 15,000 feet above the sea, near the north bend of the Columbia river. The narrow valley of its main stream forms the Athabasca pass; and that of a more northerly arm is the site of the Yellow Head pass, 3,746 feet above the sea, through which the Canada Pacific railway is intended to be carried. At ninety miles, where the mountains still rise over 7,000 feet above the sea, it turns from north to north-east, and at 180 miles further (chiefly in mountain country), receives on the south, McLeod's river, about 200 miles in length. At 108 miles further it receives, on the south, the Pembina, about 250 miles long, a large and partly navigable stream, whose banks present, besides fertile land, thick beds of lignite coal. The Athabasca here is 300 yards in width, flowing with great depth and a strong current, in a valley from one to two miles wide and 250 feet below the surrounding plain. At fifty miles further it receives, from the north-west, by a river forty miles long, the waters of Lesser Slave lake, which is 100 miles in length. Then, after elbowing south-east, it turns nearly north, and about 434 miles further delivers into Lake Athabasca the surplus water of its area of about 68,100 square miles. For the last 160 miles, from Clear Water forks to the lake, it is described as a noble, navigable stream, from a quarter to a half mile in width, six feet deep in shallowest parts at low water, flowing smoothly through land of the richest description. The last 450 miles of its course is through a fertile country, richly wooded, with prairies interspersed, its banks presenting, in parts, beds of lignite coal and bitumen, and springs of petroleum. From its source to Lake Athabasca, about 862 miles, its total fall is about 3,000 feet. After traversing for thirty miles the west end of Lake Athabasca, at seventeen and a half miles further, augmented by the surplus waters of the basin of that lake and its other tributaries, which is about 60,500 square miles in area, including the lake's surface of 4,200 miles, it pours into Peace river the surplus waters of about 128,600 square miles, with a course of about 902 miles to their junction.

Peace river is the main branch of the Mackenzie. The Findlay, or north branch of it, about 300 miles long, and the Parsnip, or south branch, about 200, have their courses in the great irregular valley beyond and parallel to the Rocky Mountains, the north end of which sends forth the Yukon of Alaska, and the south end drains into the Fraser river of British Columbia, whose waters are divided from those of the Parsnip river by a summit elevation of only 2,200 feet above the sea. After receiving the Parsnip at an elevation of 1,650 feet, the Peace river, varying from 150 to 300 yards in width, powerful and deep, swift in parts, but smooth and easily navigable throughout, turning more eastward, enters and traverses for thirty miles the main range of the Rocky Mountains, through scenery of almost inconceivable grandeur, with steep rocky mountain-flanks or terraces, clothed with stately woods abutting the stream, rugged peaks towering 4,000 or 5,000 feet above the eye, and occasional glimpses of more lofty and remote snow-clad summits. At seventy miles from the forks, the Mountain portage, fourteen miles across, the last foothill range, the river is reached—the head of it 1,510, and the foot 1,270 feet above the sea. At 180 miles further is Fort Dunvegan; at seventy miles lower Smoke river, 170 miles long, so called from its burning coal-beds. At 150 miles further, and northward, is Fort Vermillion. At forty-five miles lower are the falls, twenty feet in height, and twenty miles further the River Rouge, 170 miles long, enters from the south. At 190 miles more, flowing generally east-north-east, Peace river joins the outlet of Lake Athabasca, after sending a southerly arm to that lake, and assumes the name of Slave river at about 1,065 miles from its source. Peace river drains an area of about 99,600 square miles. From Mountain Portage to the falls, 445 miles, it is from 400 to 800 yards wide, and is fit for navigation, apparently by large steamers, even at low water. From the falls down to its mouth it is equally navigable, and beyond that there is continuous navigation for 230 miles through Lake Athabasca to its east end, 350 miles from Hudson's bay, forming, together, over 885 miles of navigation extending to within 350 miles of the navigable inlets of the Pacific, with the obstruction of these falls only. Between Lake Athabasca and the falls the country is low and generally wooded. Thence upwards the elevation of the adjoining plains increases gradually from 200 feet above the bed of the river to 600 feet at Dunvegan, rich prairies prevailing, combined with a large proportion of dense forests of trees of great size, chiefly on the south side, where a country of surpassing beauty and fertility, well watered and varied in surface, with immense treasures of fuel beneath, extends to the skirts of the mountains.

Owing partly to its comparative depression, and probably also to the admission of warm-air currents from the Pacific by the Peace River gap through the mountains, this part of the valley of the Mackenzie has a singularly mild climate for its latitude. Meteorological registers, and the experience of residents, prove it to have an early spring, and that its average temperature from April to October, inclusive, is very nearly that of Toronto. Prof. Macoun, of Albert University, Belleville, Ontario, on botanical exploration, found *flora* indicative of climate common to Belleville, and Professor Selwyn, director of Canadian geological surveys, exhibited samples of wheat, weighing sixty-eight pounds to the bushel, raised at Fort Chipeweyan, at the north-west end of Lake Athabasca, sown May 21st and reaped August 16th, 1875, that yielded sixty bushels to the acre.

About 120,000 square miles of the basin of the Mackenzie south of latitude 60° N., may be considered suitable, generally, for the successful cultivation of whêat; much of it is exceedingly fertile. Lake Athabasca, for 200 miles of its length, and its eastern tributaries lie on the broad belt of rugged Laurentian highlands. At its west end its waters unite with those of the Athabasca and Peace rivers, forming, together, the outflow of an area of about 228,200 square miles, and flow northward 231 miles to Slave lake, under the name of Slave river, through the irregular fracture between the rugged Laurentian belt and the Silurian and Devonian formations of the great plain west of it. Slave river is, for eighty miles, navigable; then twenty-four miles are obstructed by rapids, requiring seven portages, amounting, together, to over two miles in length, being the only carrying places encountered by Sir Alexander Mackenzie either on descending or ascending the 1,649 miles of his river, between Clear Water forks of the Athabasca, latitude 56° 42′ N., longitude 111° 15′ W., and the Arctic ocean. Slave lake is 320 miles long by sixty miles in greatest width; it area is over 11,300 square miles. Near its middle, where Slave river enters it, the division line between the geological formations mentioned crosses it; turning north-eastward the highlands rise 1,100 to 1,400 feet above the lake, in parts columnar and precipitous, presenting scenes of singular wildness and grandeur. Besides Slave river, Slave lake receives from the south-south-west, near its western end, Hay river, 410 miles long, through prairie plains from east-south-east; the Thetinah, 470 miles, through Laurentian highlands; and at its eastern end the waters of a chain of lakes extending 320 miles, besides lesser tributaries. Augmented by the waters of the basin of Slave lake, 135,000 square miles in area, the Mackenzie leaves it with a strong and occasionally rapid current from one-half a mile to two miles wide, and from four to twelve fathoms deep. At 206 miles the Stony rapid, nine miles long, is reached (from which to the Arctic ocean, 888 miles, there is no apparent interruption to ship navigation). At fifteen miles further, a little above Fort Simpson, latitude 61° 51′ N., longitude 121° 25′ W., its clear waters meet those of the turbid River of the Mountains, which is half a mile wide, about 850 miles long, and drains an area of over 100,000 square miles. From its source, near that of the Yukon, the River of the Mountains flows south-eastward over 400 miles, in the same great geographical trough, then sweeping eastward through the main range of the Rocky Mountains flows north for nearly 300 miles; probable total descent about 2,000 feet. It has large tributaries. On its lower course wheat can be grown fairly, but with occasional failures. The Mackenzie river, at 320 miles further, ten miles beyond Fort Norman, receives from the east, in latitude 64° 55′ N., longitude 125° 40′ W., Great Bear Lake river. Its extent to the remotest feeder of the Great Bear lake is probably about 460 miles. It drains an area of about 47,300 square miles, of which the lake, which is 200 miles in length by 120 in greatest width, covers 12,300 square miles. From the lake to the Mackenzie, 100 miles, Great Bear river falls 150 feet. Near its mouth it is stated to be about 700 feet in width; but its clear, blue waters are swift and deep. At 172 miles further Root river enters on the left at the ramparts or narrows, below which, at eighteen miles further, the Mackenzie expands to ten miles in breadth, and ten miles further on to thirty miles, forming a delta of many channels (at the west side of which Peel river, 370 miles long, enters from the south), and, spreading to fifty miles among low thickly-wooded islands, at ninety miles further enters the Arctic ocean in latitude 69° N.

About the mouth of the Mackenzie, though practically inaccessible from Behring's straits, is the richest site for whale-fishing known; and as coal is very abundant along the banks of the Mackenzie, and about its mouth, whale-fishing by steam vessels might, apparently, be carried on with great advantage there, as the vessels might be employed in fishing during all the open season, and be laid up in winter in the mouth of the Mackenzie. The produce of the fishing might be taken by tug-drawn barges 888 miles up the Mackenzie to Stony rapids, and probably, steaming it nine miles further on by some extra power and improvements, could then ascend 460½ miles to the Rapid de Noyes on Slave river. Then, with a land conveyance of twenty-four miles, and 266½ of unbroken, deep navigation, Clear Water forks of the Athabasca would be reached, which is only 110 miles from the northerly and more favorable of the proposed routes for the Canada Pacific railway to cross the River Athabasca, in latitude 55° N. By this route, at some future day, Arctic whale-oil may be conveyed to Lake Superior, and any destined market, at very much less cost and risk than it is now brought, *via* Behring's straits, Honolulu and Cape Horn, a route of 25,000 miles, the dangers of which are shown by the fact that twenty-four ships were lost near Point Barrow in 1876, and over thirty were lost there a few years before on their way from the Arctic cruising grounds. And it may be added that crude petroleum can be found in unlimited quantities both in open springs, and where it permeates the soil copiously along the banks of the Athabasca on the last-mentioned navigable reach.